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(54) DATA BASE ACCESS DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To shorten the time required before image display at the time of data base inquiry.

SOLUTION: A data base record meeting standards of data base inquiry is returned by a data base server 30 and information of this returned data base record is displayed on a client processor. A data compressed image from the data base server is expanded and is stored in a data cache 130 by the client process. The client process retrieves, expands, displays and stores small parts of images related to data base records and retrieves, expands and stores the data compressed image related to the data base record which is returned from the data base server but doesn't need displaying.

CLAIMS

[Claim(s)]

[Claim 1] Have the following and the above-mentioned client processor A small part of an image about the above-mentioned database record returned by the above-mentioned database server is searched, elongate and display, carry out operation which the above-mentioned data cache is made to memorize and the above-mentioned

client processor from it. A database access device which searches an image about database record which does not require a display by which the data compression was carried out develops now although returned by the above-mentioned database server and is characterized by carrying out operation which the above-mentioned data cache is made to memorize.

A database server which carries out operation which answers data base inquiries by returning database record suitable for a standard specified by data base inquiries to a client processor.

Emit data base inquiries to the above-mentioned database server and it has a client processor which displays information which shows database record returned by database server. A data decompression machine which elongates an image which the above-mentioned client processor received from the above-mentioned database server and by which the data compression was carried out.

A data cache which memorizes elongated image data showing those images.

[Claim 2] A device of Claim 1 connected by data communication link in order that the above-mentioned client processor may operate with a client-data treater different from the above-mentioned database server and these client data may perform transfer of the above-mentioned database server and data.

[Claim 3] The above-mentioned database record including the main image showing the feature of this record and one or more subimages showing the feature of a small part of this record the above-mentioned client processor. Although returned from the above-mentioned database server the main image about database record which does not require a display by which the data compression was carried out is searched now Claim 1 which carries out operation which searches a subimage about database record which carried out operation which elongate and the above-mentioned data cache is made to memorize and was returned from the above-mentioned database server by which the data compression was carried out elongate and the above-mentioned data cache is made to memorize or a device of Claim 2.

[Claim 4] When the above-mentioned data cache fills with image data the above-mentioned client processor. Overwrite is made an image most memorized early in the above-mentioned data cache. A device of any 1 paragraph of Claims 1-3 which carry out operation which makes an image which was searched newly and elongated memorize unless the image memorized most early is related with database record displayed now.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the device which accesses a database especially the database which has the database record containing image data.
[0002]

[Description of the Prior Art] When accessing a database a database sends declaration of intention of "reference i.e. a search to a database, and a typical way returns the entry of a database or the details of a record suitable for the standard specified by a hit i.e. the reference responding to it.

[0003] Some databases have a record containing image data. An example is a video archive database. One image (image) or the picture stamp" which expresses the feature of the whole video clip archived (record-keeping) to it is memorized at the comment-characters [about the clip] and keyword side. When a database replies to a user's reference a user is able to carry out the scroll display of an image and the text to a user and to enable it to identify desired database record promptly.

[0004]

[Problem(s) to be Solved by the Invention] However when database record contains image data a lot of data in the case of the response from a database will be transmitted to the application and the computer of the client which made a reference. This is because the digitized image generally contains a lot of data compared with text.

[0005] When the application and the database which make a reference are inherent in the same host computer can receive this data of a lot of transmitted but, the case where they are in another machinery linked by the network connection to which bandwidth like an Ethernet (ethernet) link was restricted for example — ** — a lot of data transfers [like] pose a problem. This problem gets still worse when that database is accessed by many client computers or when that network is already in a heavy-load state by other data communications.

[0006] The method of only one appearance which reduces this problem that transmission of the digitized image becomes slow will be compressing those images using compression technique like a publicly known JPEG technique. However if there is delay when transmitting an image to the client which referred to the database the time which extension (decoding) of the image before displaying an image on the delay further takes will be added. In an above-mentioned scroll method such a delay becomes subjective very offensive to the eye for a user. Therefore SUBJECT of this invention is reducing an above-mentioned problem.

[0007]

[Means for Solving the Problem] This invention provides a device for accessing a database which has the database record containing image data by which the data compression was carried out and the device By returning database record suitable for a standard specified by data base inquiries to a client processor Data base inquiries are emitted to a database server which carries out operation which answers data base inquiries and a database server Have a client processor which displays

information which shows database record returned by database server and a client processor. A data decompression machine which elongates an image which was received from a database server and by which the data compression was carried out. Have a data cache (cache) which memorizes elongated image data showing those images and a client processor. Search a subset (small part) of an image about database record returned by database server by which the data compression was carried out. elongated display carry out operation which a data cache is made to memorize and a client processor from it. Although returned by database server an image about database record which does not require a display by which the data compression was carried out is searched and it elongates now and operation which a data cache is made to memorize is carried out.

[0008] This invention tends to conquer an above-mentioned problem by providing cache memory of image data elongated by client work station. That is cache memory is made to memorize other images about much more details of a hit which is displayed for a user a "hit" of other databases under present reference or now in addition to an image which needs the present display.

[0009] In a way to which cash of a part of this elongated image (temporary storage) is carried out delay between a user's instructions and a display of a corresponding image (assuming that cash is carried out) can be lessened and a delay subjectively offensive to the eye mentioned above can be avoided or reduced.

[0010]

[Embodiment of the Invention] Hereafter with reference to Drawing this invention is explained concretely. Drawing 1 is a schematic diagram of a video archive system. This system has the client work station 10, the device / tape control computer 20, the database server 30 and the archive controller 35. These are all linked on Ethernet local area network (LAN) connection, the RS-422 router 15, the videotape recorder (VTR) 40, the video (and audio) router 50, the data converter 60 and the archive tape recorder 70 (connection).

[0011] The archive controller 35 controls and adjusts all the operations of a device / tape controller 20 and it communicates with a database server (in order to consult or correct the database held at this server) and a client work station (in order to receive instructions).

[0012] The database server 30 holds the database of the raw material (refer to after-mentioned) archived. A device / tape controller 20 answers the instructions which an archive controller emits/generates specific RS-422 or SCSI instructions and drives the controlled devices 40, 50, 60 and 70 (and other similar devices (not shown)).

[0013] The RS-422 router 15 carries out operation which sends RS-422 instructions to VTR 40 from either one of a device / tape controller 20 or the client work station 10.

[0014] an archive [in / client work station / each / to the end / in human being's record custodial employees / a database] (storage record) -- business -- it is used

for using for creation of a raw material or creation of a corresponding entry looking through the entry or record of a database or searching. A client work station is de facto "client". A task is performed by telling a high-level archive task to an archive controller, an archive controller's ranking second and defining the procedure of those tasks, for example giving a command to a device / tape controller 20.

[0015] This archive system operates by the two main operational modes. When it is going to archive the video material (not accompanied by it or accompanied by an audio raw material) which carries out ingress, the raw material is reproduced from VTR40 and it views and listens in the client work station 10. human being's operator (it is called record custodial employees.) -- and a name, various keywords and an abstract and other information are added to the video material. This additional information constitutes a database entry and is memorized in the database maintained by the database server 30. On the other hand a video material is memorized by the archive tape recorder 70. A this "archive creation" process is described in detail later.

[0016] In the following process ("archive search") an operator looks through the database entry held at the database server 30 using the client station 10 (or other client work stations connected to this network). For example the user may look for the video material with a specific related keyword. In this way if a user finds the work of one or more video materials it is believed that are suitable for the present demand a user will decide the procedure of retrieving operation and will search the video material from an archive tape recorder. These two processes are explained future in detail.

[0017] In the operational mode of archive ***** it is reproduced from VTR (for example the Sony digital-beta-cams videotape recorder) and an ingress video material is coded by publicly known compression format video (what is called a MPEGII 4:2:2 P@ML format). The compressed data is supplied to the client work station 10 via the video router 50 in the data transmission format known as "SDDI" and it can be viewed and listened to record custodial employees there.

[0018] In this archive creation stage the channel selection performed by the video router 50 is controlled by the device / tape control computer 20 and it answers instructions by the client work station 10 again. However the RS-422 instructions which control VTR40 to the quick control by human being's operator are sent to direct VTR40 from the client work station 10 via the RS-422 router 15. Therefore a device / tape controller 20 operates a RS-422 router as the 1st step using the RS-422 control line 25. RS-422 instructions are connected with VTR from the client work station 10 and many instructions are directly delivered between archive creation processes all the time. Therefore if suitable instructions are emitted in the client work station 10 when record custodial employees want to play the particular part of a tape it will be told to VTR40 using the conventional RS-422 control protocol via the RS-422 router 15.

[0019] Probably it reproduces several times from the start of the raw material which it

is going to archive to the end and about the occurrence covered with a video material record custodial employees understand thoroughly and are well versed. In record custodial employees the gestalt of the database entry generated by software is shown in the screen of the client work station 10 and record custodial employees get to know the information which should be used to classify the video material concerned there. Record custodial employees can choose from this raw material each frame which acts as a "picture stamp" and can be stored in database record as the image showing especially the feature of the video material concerned or a camera shot (photograph) in a video material. These information matters constitute a database entry together and are added to the conventional database maintained by the database server 30.

[0020] If a database entry finishes being created and memorized a video material will be transmitted to the data converter 60 via the video router 50 from VTR 40. When carrying out this the archive controller 35 The related device which gives a command to a device / tape controller 20 and contains the RS-422 router 15 in it is operated Send RS-422 instructions to the VTR from a device / tape controller and emit a required operating command and this VTR is made to set to reproduction mode and the archive tape recorder 70 is made to set to a recording mode. The data converter 60 receives a video data by a SDDI synchronous transmit format and outputs this video data to the archive tape recorder 70 by a SCSI data transfer format.

[0021] Since the SCSI transmit format cannot tend to make data transferring operation start with sufficient speed for synchronous video-data transmission on the character the data converter 60 It had a big buffer memory (not shown) and a delay required to send out data to a data converter from delivery or this is given.

[0022] Archive tape recorder 70 the very thing is a helical scan type digital tape recorder like Sony GY10 tape recorder. Since this device is an original "data" recorder it also receives data other than a video data but it should be careful of as a matter of fact the immense raw material memorized by the archive tape recorder being a video data in this embodiment.

[0023] This video data and some of other data are recorded on the archive tape recorder 70. Speaking concretely sending a video data to the data converter 60 through the video router 50 from VTR 40 as mentioned above and finally sending it to the archive tape recorder 70. And other associated data (for example data drawn from the database entry to the raw material concerned) It is sent to a device / tape controller 20 via LAN from the database server 30 and is sent to the archive tape recorder 70 via a SCSI link from the device controller 20.

[0024] In a typical applications since there is dramatically much quantity of the video data which should be archived by doing in this way a robot (automatic) library system may be used coordinating it with the archive tape recorder 70. be robotomorphic anyhow or carry out using which of a manual library system since it is expected that a

lot of it is needed. The database entry (this is memorized by the database server 30.) to the video material archived by the specific tape contains the tape identifier which identifies again the proper tape (two or more tapes when making many copies) in which the raw material concerned was memorized.

[0025] The 1st step of archive search archive retrieving operation is identifying a thing suitable for the video material which it is going to search. A user by looking over roughly the database memorized by the database server 30 this can be performed from the computer work station (the client work station 10 — like) connected to the database server 30 via the Ethernet link. The structure of this search may look for a necessary video material using a keyword name information or a summary sentence like before. A search, i.e. a reference process is described in detail later.

[0026] Once it finishes identifying a necessary raw material a user will emit instructions and these instructions will be sent to the archive controller 35 via an Ethernet link. An archive controller emits instructions to a device / tape control computer 20 and searches a video data the archive tape recorder 70 or fence necessary again. Issuing the instructions which make proper time start setting up the SCSI link between an archive tape recorder and a data converter setting up the RS-422 link between other devices and reproduction/recording mode of a device is included in execution of these instructions.

[0027] Generally in a typical system by the archive controller 35 these instructions are put in order by the single tier and are started and performed by the priority.

[0028] When performing instructions and searching data from the archive tape recorder 70 it is required first in the archive tape recorder 70 to arrange a right tape (for example robot library system (not shown)). And a device / tape control computer 20 Set up the SCSI link from an archive tape recorder to a data converter and proper RS-422 instructions are emitted to data converter router and VTR 40. Reproduce a video data from the archive tape recorder 70 make it send to the data converter 60 through a SCSI link and make it change into a SDDI synchronous transmit format and also VTR 40 is made to supply via the router 50 and it is made to record. It can view and listen to that raw material by one of the computer work stations from VTR in this process or the back.

[0029] Thus in an above-mentioned example of operation it is necessary to emit RS-422 instructions simultaneously on a data converter a router and VTR. There are not only the necessity of emitting instructions simultaneously but requirements troublesome layer that it must often decide on the time of instructions in the accuracy of a subfield (below the field) to the external source of video synchronizing signals. the time of an archive creation process in case this requirement tends to archive the video signal which carries out ingress from other portions of a studio — or It may have been held at the time of the archive retrieval process in the case of searching the portion by which a video signal is archived at specific time and recording or transmitting at other places of a studio.

[0030]The server and controller (namely a device / tape controller 20, the database server 30 and the archive controller 35) which are used for the device of drawing 1. The Microsoft Windows NT operating system. It is a standard PC compatible general purpose computer which operates with the QNX real-time operating system (a device / for the tape controllers 20) currently sold from (the database server 30 and the object for the archive controllers 35) or the QSSL company. These operating systems make possible message drive multitasking between the processing tasks mostly generated simultaneously within each server and bring about efficient use of the treatment capacity of a server. However, the time when specific operation is generally performed in the accuracy below a video frame period required to emit a control command to the controlled video devices 40, 50 and 60 for this reason cannot be predicted.

[0031]Drawing 2 is a schematic diagram showing the operation of the client work station 10 performed when looking through a database. The client work station 10 has a display / user interface controller 100, the cache controller 110, the data decompression (decoding) machine 120, the cache memory 130 and the display/input device 140 (for example, a computer keyboard and a computer display screen).

[0032]At the start of database list operation, a display / user interface controller 100 sends a user's reference to the database server 30. This is a standard database access technique. Probably, reference is a keyword for comparing with the abstract about the video material held at the database server 30, a period (for example, look for all the raw materials made on 1-March 3, 1997), theme, Reference documents, etc. A database returns the image "handle" corresponding to those database hits responding to this with some databases "hit", i.e. the details of the database record suitable for the search standard taken out with reference.

[0033]An image handle is a pointer in which the position of the image data which is memorized by the database and expresses the picture stamp corresponding to a database entry is shown. In order to memorize one image in digital, even if it performs a data compression, generally it is necessary to memorize remarkable data volume. This data is altogether returned to a display / user interface controller 100 responding to data base inquiries, then it will be accompanied by considerable delay. An image handle, i.e. a pointer, is returned to a display / user interface controller for this Reason. That is because there is little data volume which an image handle occupies farther than the quantity of the whole image.

[0034]A display / user interface controller is displayed on a display device by the output format which chooses a necessary image and is chosen promptly now and sends an image request to the cache controller 110. In the cash register 115, reference is returned to the database server 30 and the cache controller 110 obtains the demanded image data if the demanded image confirms whether held at the cash 130 and is not held. This image data is returned to the cache controller 110.

[0035]Since the image data is compressed, a cache controller sends the compression

image data which received from the database to the expander 120 and makes the cash 130 memorize the elongated data. The image data in which the image demanded now was elongated is returned to a display / user interface controller 100 via a cache controller and is displayed on a display / input device 140 again.

[0036] once [a display / user interface controller finishes sending a demand instance] [in this way / a display / user interface controller / about the same database search / other / an image / download and elongating / begin]. Speaking generally that operation resembling **** although the example of this process is shown below. That is a display / user interface controller 100 advances [carrying out cash of the image to a cache controller further and] a demand (however a display / user interface controller is not returned instance.). A cache controller searches for those images from the database server 30 and makes the cash 130 memorize them after extension by the expander 120. A cache controller updates the cash register 115 again by details of the image by which cash was carried out newly.

[0037] In the example of **** the database memorized by the database server 30 has the database record which has the following format respectively.

[0038] In this format the database record corresponding to a raw material clip contains the picture stamp showing an overall description and the overall ("main") feature. Therefore each description and a picture stamp are broken into each small part (camera shot from which it probably differs in this raw material variously) of a raw material by reliance. It is assumed that there are 12 records whose standards which perform the search which looks for 12 records as a database "hit" namely were specified in search reference a user suits.

[0039] In the first stage a user will sometimes want to see only a main image stamp and overall description from each record. When all 12 database hits of this information form can be displayed simultaneously it is required that a display / user interface controller should be elongated from all 12 main image stamps promptly in quest of that image data to a cache controller (decoding).

[0040] However when all 12 records cannot be put into a display screen at once the format which can scroll them shows and the small part of a record can be seen at any time. In this case first a display / user interface controller to a cache controller. What it asks for the small part of 12 main images it elongates and is displayed promptly is required and in quest of the remainder of 12 main images it elongates to a cache controller and demands to enable it to scroll the group of 12 hits smoothly and promptly. For example when the information about four hits can be displayed at once a display / user interface controller Search of the main image stamp to the first four records extension and a cash advance are made to start (in order to display promptly) and subsequently search of the eight remaining main image stamps extension and a cash advance are made to start.

[0041] Once the "main" images about a database hit do in this way are searched and finish being elongated it will order elongating a display / user interface controller in quest of the image about the small part of each database hit to a cache controller. This operation is performed by foreseeing a demand of the user who would like to see in more detail one of the database record which appeared as a hit in the above-mentioned search. Therefore if it does in this way when a user does such a demand it will be searched and elongated from a database by that time and the necessary picture stamp image about the small part of the record concerned will have finished be memorized by the cash 130.

[0042] The cache controller 110 makes every stage show the time of which image is memorized by the cash 130 and when cash of the image was carried out to a cash register. The specified number was elongated and image maintenance can be carried out for example the cash 130 can carry out cash of the 100 images in this embodiment. When it is already going to carry out cash of the new image to the full cash 130 the oldest thing is thrown away among the images by which cash was carried out. However when the image is a thing about the record examined by the user now it removes.

[0043]

[Effect of the Invention] According to this invention when database record contains image data the time taken to answer reference of a database and to return the database "hit" to a client is shortened and a user can see the image displayed promptly as explained above.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is a schematic diagram of a video archive system.

[Drawing 2] It is a schematic diagram of the client work station in the system of drawing 1.

[Description of Notations]

10 A client work station and 30 A database server
120 data-decompression machine and 130 A data cache and 100 110 Client-data treater